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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/813,257	03/19/2001	Lowell E. Kolb	10001844-1	2624

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HEWLETT-PACKARD COMPANY
Intellectual Property Administration
P.O. Box 272400
Fort Collins, CO 80527-2400

EXAMINER

DINH, TUAN T

ART UNIT	PAPER NUMBER
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2827

DATE MAILED: 11/20/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/813,257	KOLB ET AL.	
	Examiner	Art Unit	
	Tuan T Dinh	2827	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-17 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-17 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
 * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
 a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 6) ☐ Other: _____

DETAILED ACTION

Applicant's appeal brief is persuasive and, the finality of the previous office action is hereby withdrawn.

Response to Arguments

Applicant's arguments with respect to claims 1, and 3-17 have been considered but are not persuasive.

Applicant argues.

(a) McCullough does not teach "first coating layer 14 so as bridge across and infill a circuit board cavity to render the cavity substantially inaccessible"

(b) McCullough teaches a first coating layer 14 with gaps and openings to the PCB cannot render the coated portion of the PCB.

(c) McCullough does not teach a second coating 16 to "bridge across one or more openings of cavities on the PCB so as to render the cavity substantially inaccessible to subsequently-applied coating"

Examiner disagrees.

Response to arguments (a) and (c), McCullough shows in figure 1, that a PCB (12) having electronic components (22), coating layers (14, 16) being deposited on almost, and preferably all of the PCB surfaces (20), column 3, lines 8-10, so as bridge across and infill a circuit board cavity (a space between and beneath leads of the components 22) to render (melt) the cavity substantially inaccessible.

Response to argument (b), McCullough's reference shown in figure 1 teaches the coating layers (14, 16) facilitated render the coated portion to the PCB.

Note on claim languages

Regarding claim 1, examiner would treats "a cavity having one or more openings to a printed circuit board (PCB)" in claim 1, lines 4-5 such as the one or more openings that defined spaces between components mounted on the PCB.

Regarding claim 3, lines 1-2, examiner would treats "the cavity comprises a volume space defined by leads of a component" such as the volume space that defined underneath between the leads of the component.

Regarding claim 12, lines 5-8, examiner would treats "a plurality of cavities defined by component leads, and each cavity includes a plurality of openings to the surface of the PCB" such as the openings that defined underneath of the leads of the component.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

2. Claims 1, 3-5, 7, 12, 14-15 are rejected under 35 U.S.C. 102(e) as being anticipated by McCullough et al. (U. S. Patent 6,127,038).

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

As to claim 1, McCullough et al. disclose a printed circuit board (PCB, 12-figure 1, column 2, line 37) comprising:

- a printed wiring board (12);

- a plurality of components (22, column 3, line 1) mounted on said PWB, wherein the PCB has a cavity with one or more openings (underneath of component 22) to the surface of the PCB; and

- an electrically non-conductive filler material (14, column 3, lines 8, 52-64) disposed in the cavity and on the surface of the PCB immediately surrounding the cavity so as bridge across and to at least partially infill the one or more openings of the cavity, wherein the filler material renders the cavity substantially inaccessible to subsequently-applied coatings (16, column 3, line 15).

As to claims 12, and 15, McCullough et al. disclose a printed circuit board (PCB, 12-figure 1, column 2, line 37) comprising:

- a printed wiring board (12);

- a plurality of components (22, column 3, line 1) having a device body mounted on said PWB to form one or more regions of the PCB having a high variable and cavitatious surface including a plurality of cavities defined by component leads, wherein the PCB has a cavity with one or more openings (underneath of component 22) to the surface of the PCB; and

a layer of non-electrically-conductive filler material (14, column 3, lines 8, 52-64) conformingly adhered to the PCB surface in the one or more regions to provide a contoured, contiguous filler material surface having gradual transition, wherein the filler material bridge across the cavity openings and at least partially infill the cavity, wherein the PCB further comprises a low viscosity dielectric coating (16) so that the filler material prevent the dielectric coating from entering the plurality of cavities.

As to claim 3, McCullough et al. disclose the PCB (12) wherein the cavity comprises a volume of space define by leads (24, column 3, line 2) of the components (22), the component body and the PWB, wherein the volume of space has a plurality of openings to the surface of the PCB between neighboring component leads.

As to claims 4-5, McCullough et al. disclose the PCB wherein the cavity comprises a volume of space between neighboring components mounted on the PCB.

As to claims 7 and 14, McCullough et al. disclose the PCB wherein said filler material is an epoxy (column 3, line 34).

As to claim 15, McCullough et al disclose the PCB further comprising a low viscosity, high adherence dielectric coating (16) that, when applied and cured, covers predetermined portions of said PCB including at least a portion of the one or more regions coated with sad filler material (14), wherein the filler material prevents the dielectric coating from entering the plurality of cavities.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 6, 8-10, 13, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over McCullough et al. (U. S. Patent 6,127,038) in view of Kotani et al. (JP 200034457 A, hereafter JP).

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

As to claim 6, 9, 13, and 17, McCullough et al. do not disclose the filler material is thixotropic and thermally cured epoxy. Kotani et al. (JP) shows a high-pressure resistant thixotropic epoxy resin adhesive (see abstract) including a thermally cured epoxy.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ thixotropic epoxy resin including a thermally cured epoxy in the PCB of McCullough, as taught by Kotani et al. (JP) for the purpose of retaining a sufficient adhesion thickness under high bearing pressure and maintaining a strength at temperature that applied on the surface of the PCB.

As to claim 8, McCullough et al. do not disclose said epoxy is one of the family of Bisphenol-A epoxies mixed with an amine hardner.

Kotani et al. (JP) shows a epoxy resin is one of the family of Bisphenol-A epoxies mixed with an amine hardener (see pages 2-3 of the translation).

It would have been obvious to one of ordinary skill in the art at the invention was made to employ a epoxy resin is one of the family of Bisphenol-A epoxies mixed with an amine hardener in the PCB of McCullough, as taught by Kotani et al. for purpose of providing a stiffness and high temperature performance.

As to claim 10, McCullough et al. do not disclose said epoxy be a latex based non-electrically conductive epoxy. Kotani et al. shows a epoxy resin that is a latex based non-electrically conductive composition (see pages 2-3 of the translation).

It would have been obvious to one of ordinary skill in the art at the invention was made to employ a epoxy resin is a latex based non-electrically conductive epoxy in the PCB of McCullough, as taught by Kotani et al. for purpose of providing a high resistance to damage from moisture and high temperature performance.

5. Claims 11 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over McCullough et al. (U. S. Patent 6,127,038) in view of Higgins, III (U. S. Patent 5,639,989).

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

As to claim 11, McCullough discloses the PCB wherein the subsequently-applied coating (16) comprises a layer of dielectric coating that conformingly coats exposed surfaces of the PCB including the filler material (14), the dielectric coating formed of a

low viscosity material (column 3, lines 65-66) that facilitates accurate application of the dielectric coating, wherein the at least one or more cavity openings is sufficiently large to prevent the dielectric coating from bridging across the cavity openings without the presence of the filler material.

Although, McCullough et al. do not disclose the layer of dielectric coated on the surface of the PCB by using a spray atomized technique, this limitation is taken to be a product by process limitation, and it is the patentability of the claimed product and not of recited process steps which must be established. Therefore, when the prior art discloses a product which reasonably appears to be identical with or only slightly different than the product claimed in a product-by process claim, a rejection based on sections 102 or 103 is fair. A product by process claim directed to the product per se, no matter how actually made, *In re Hirao*, 190 USPQ 15 at 17 (footnote 3). See *In re Fessman*, 180 USPQ 324,326(CCPA 1974); *In re Marosi et al.*, 218 USPQ 289,292 (Fed. Cir. 1983); and particularly *In re Thorpe*, 227 USPQ 964,966 (Fed. Cir. 1985), all of which make it clear **that it is the patentability of the final structure of the product** "gleaned" from the process steps, which must be determined in a "product by process " claim, and not the patentability of the process. See also MPEP 2113. Moreover, an old or obvious product produced by a new method is not a patentable product, whether claim in "product by process" claim or not.

Higgins, III shows a dielectric coating layer (26, column 6, lines 64-67, column 7, lines 1-25) coated on an epoxy layer (24, column 6, lines 23-32) by spray technique as providing as a well know technique.

It would have been obvious to one of ordinary skill in the art at the invention was made to use a spray technique employed in the PCB of McCullough, as taught by Higgins, III for purpose of reducing porosity, voids in spray deposited material that has been devised, and providing ground shielding potential to the PCB.

As to claim 16, McCullough et al. do not disclose the PCB further comprising a conductive coating covered the dielectric coating layer.

Higgins, III shows a conductive coating (62; 64, column 9, lines 53-67) covered a dielectric coating layer (60-figure 3).

It would have been obvious to one of ordinary skill in the art at the invention was made to employ a conductive coating covered a dielectric coating in the PCB of McCullough, as taught by Higgins, III for purpose of providing ground shielding potential to the PCB.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Varde et al., and Ashida et al. disclose related art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tuan T Dinh whose telephone number is 703-306-5856. The examiner can normally be reached on M-F.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0658.

Trent D. M.

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